



# AN OVERVIEW OF THE IMPACT OF ARTIFICIAL INTELLIGENCE ON THE MEDICAL AND EDUCATIONAL SECTORS

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## ABSTRACT

During the last decade, Artificial Intelligence (AI) has been the subject of numerous scientific, psychosocial, anthropological, and behavioral studies and has attracted the attention of hundreds of millions worldwide. The progress made in science is extraordinary and affects almost all areas of human life. For example, in the medical sector, doctors are assisted by sophisticated robots during surgeries. In education, AI is more commonly used in work environments such as e-learning. Even in transportation, a feature now allows cars and airplanes to go into auto-pilot mode. A new way of life is offered to humans with the proliferation of AI and its various applications in the daily lives of humanity. AI intervenes and solves problems that seemed insoluble some time ago. This intelligence radically transforms people's habits and behaviors. These new technologies promise to improve the lives of citizens by making them easier, less painful, and more pleasant by guaranteeing them less effort, more efficiency, and more output. While technology has evolved over the millennia that humans have existed and has shown its clear benefits, the last century has seen a technological explosion that has influenced subtle but significant changes in how humans see the world and interact with others. However, humans are wary of the negative impact of these scientific and technological advances in Artificial Intelligence on their personal, familial, and social lives. This fear is justified by the various changes transforming modern man's life. The very structure of artificial intelligence has opened up previously unheard-of possibilities for altering behavior in constructive ways and also changing how people behave and interact. This research paper will explore the impact of artificial intelligence on human life. It will focus on two important human fields: medicine and education, as well as how Artificial Intelligence ameliorates human life and simultaneously worsens it.

**KEYWORDS:** Artificial Intelligence, Robots, Medicine, Education, Transportation, Technology.

## INTRODUCTION

Artificial Intelligence (AI), also known as machine intelligence, is "a branch of computer science that focuses on building and managing technology that can learn to autonomously make decisions and carry out actions on behalf of a human being." (Tehopedia.com). Ideally, AI is developed with the intention of making life easier for humanity. Humans who once had to make considerable effort to accomplish small daily tasks, whether at work, school in the fields, or home, don't have to anymore, thanks to the development of artificial intelligence. Humans now only have to program a machine to do the required tasks rapidly and efficiently. The results are often extraordinary. Earlier, in order to diagnose a disease, the doctor could often not clearly determine the cause of the suffering. Presently, machines such as scanners and computers can diagnose with minimum errors and in a short time. For example, according to the National Library of Medicine (2018), "By analyzing the clinical data from radiology (like X-ray, CT, and MRT), pathological, endoscopic, ultrasonographic, and biochemical examinations for related human body indicators, AI can output results quickly and change the ineffective traditional medical model, which is unable to give timely and accurate conclusions. As AI can solve problems in such a short time, doctors can make a more deliberate and reasonable treatment plan according to the patient's condition." Thus, even in medicine, AI has proven to be an important asset to humans.

## METHODOLOGY

This research paper employed a qualitative secondary approach, utilizing existing literature, articles, and reports related to the use of AI. The aim was to gather insights, trends, and perspectives on AI's applications and implications.

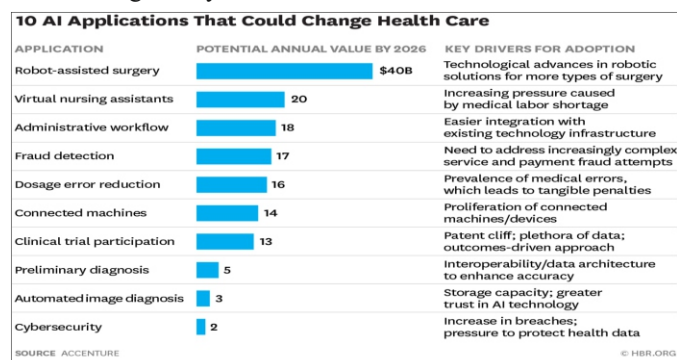
**Justification:** A qualitative secondary approach was chosen as it allows for an in-depth exploration of the multifaceted aspects of AI, drawing on a wide range of existing sources. This methodology is appropriate for comprehensively understanding the diverse dimensions of AI and its impact without the need for primary data collection.

## RESULTS & DISCUSSIONS

### 1. Impact of AI on the Medical Sector

In the field of health, AI offers interesting applications. Medical data is invaluable for predicting diseases, diagnosing pathology, or improving patient follow-up. According to Iqbal et al. (2020), AI intervenes in different medical practices, such as predictive medicine, by making it possible to anticipate disease and its evolution. There is also precision medicine, which works by helping with the recommendation of personalized treatments. Furthermore, there is decision support, which advises on installing a diagnosis. For example, a hypothetical company could have the possibility for the elderly or dependents of having a companion robot, computer-assisted surgery that allows precision, remote operations, or prevention by foreseeing epidemics such as COVID-19. The idea of "Earlier Medicine" works in a way where AI ushers in a new age of preventative illness modeling based on big data and AI modeling. Utilizing the promise of AI, this strategy uses cutting-edge digital health technologies to facilitate precise diagnosis, prescription automation, and early illness prediction. The accuracy of the diagnosis, without a doubt, will be greater than ever before. As per Topol (2019), "new technologies will improve the precision and accuracy of diagnosis and, in doing so, will enhance treatment selection." According to Iqbal et al. (2020), the term "Earlier Medicine" refers to a proactive, temporally predictive approach to a person's health that focuses on both treating

current health issues and foreseeing and avoiding potential disease occurrences in the near future. This strategy has the ability to improve our healthcare system's overall effectiveness while saving money and lives.



**Figure 1: Top 10 AI Applications that are predicted to change the Healthcare Sector**  
Source: Adamas University (2019)

### 1.1 Pharmacy

In the pharmaceutical industry, the discovery of new drugs is long and expensive. AI overcomes these problems by speeding up the process of their development and reducing their cost by creating better designs and proposing promising new drug combinations (Sahu et al., 2022). With the use of connected medical devices (IOT), AI actively participates in improving people's health. Today, thanks to AI, patients are becoming more and more autonomous in their care pathway, which helps them improve the quality of their daily lives. More and more people are acquiring connected devices like smartwatches to track their daily statistics. Such an approach makes it possible to obtain regular information on individuals' health and move towards more preventive medicine. A paper published in the National Library by Bohr & Memarzadeh (2020) states that owing to these devices and the collection and analysis of this data, healthcare professionals could track their patients' habits and potentially help support them better. For researchers, collecting this data makes it possible to advance medical research by accessing health statistics in real time. Connected devices such as IOT (mentioned above) make it possible, among other things, to detect potentially fatal risks and treat them in time and to even be able to treat diseases at home (Affia et al., 2023). "Earlier Medicine' for tertiary prevention focuses on the deterrence of the consequences of disease, such as complications and disability. It also focuses on the overall improvement of quality of life through AI-based earlier interventions" (Iqlab et al., 2020). In breast cancer detection, AI can detect infinitely small metastases that humans do not detect, reducing the risk of misdiagnosis, among others.

Furthermore, before consulting doctors, some patients use search engines like Google to learn about their symptoms online. Thus, using search engines like Google helps in the early detection of diseases. For example, according to Tang (2006), "Doctors adept at using the internet use Google to help them diagnose difficult cases. As described in the New England Journal of Medicine,<sup>1</sup> a doctor astonished her colleagues (including an eminent professor) by correctly diagnosing IPEX (immunodeficiency, polyendocrinopathy, enteropathy, X linked) syndrome. She admitted that the diagnosis "popped right out" after she entered the salient features into Google".

### 1.2 Surgery

In surgery, surgical robots use AI to improve surgical techniques and make robotic surgery autonomous. Robot-assisted surgery is

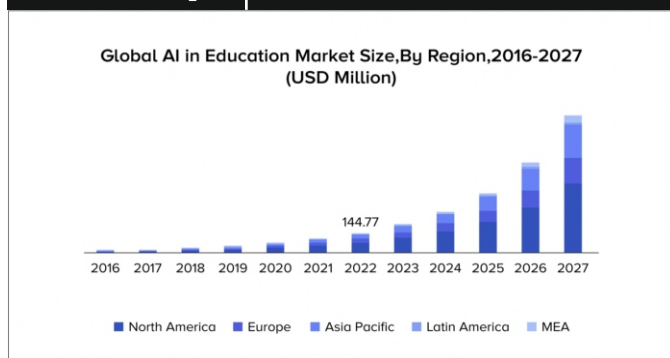
practical and widely used today. Auxiliary robots are used in patient care, nursing care, and care for the elderly and debilitated patients. "Healthcare robots have long been recognized for their promising roles to complement quality supportive health and nursing services for the growing aging population" (Dion et al., 2022). Furthermore, machine learning, a core component of artificial intelligence (AI), emerges as a crucial force poised to change the way surgery is practiced. This analysis digs into the fundamental ramifications of this AI sector, highlighting its potential to spark significant changes in the healthcare industry. The text's description of how AI adds fresh perspectives to surgical practice, "Machine learning enables machines to learn and make predictions by recognizing patterns" (Hashimoto et al., 2018), perfectly captures this idea. An especially significant aspect of AI's value is the concept of "supervised learning," as it is explained in the paper from NIH about AI in surgery. In this cognitive model, machines learn from labelled data, much like how a model is trained to recognize subtle patterns and how a medical professional learns from the guidance of more experienced peers. By giving surgeons access to a vast pool of clinical knowledge, this revolutionary change in the learning process gives them the capacity to make better decisions, which leads to better patient outcomes. Overall, the use of AI in the medical sector has revolutionized medicine and made it much more efficient, less expensive, and more accessible.

### 2. Impact of AI on the Educational Sector

In the field of education, as UNESCO mentioned, "Artificial Intelligence (AI) has the potential to address some of the biggest challenges in education today, innovate teaching and learning practices, and ultimately accelerate the progress towards SDG 4" (UNESCO, n.d.). Due to technology, blackboards and chalkboards are slowly going out of use. Machines are becoming increasingly popular tools in and out of class. Referring to the graph below, it is evident that AI in education is dramatically being adopted worldwide. This points to a unanimous acceptance of AI's vital role in the future of education. IndustryTrends (2022) states that "AI increases the personalization of student learning programs and courses, promotes tutoring by helping students improve their weak spots and sharpen their skills, ensures quick responses between teachers and students, and enhances universal 24/7 learning access." With AI, learning is often more comfortable and smoother. Interactive whiteboards and even robots are taking up more and more places in the world of education, especially in developed countries such as America and Europe.

Furthermore, AI-driven educational platforms enable adaptive learning, adjusting content delivery based on individual student performance, ensuring that students get the right content at the right time. This tailoring of educational experiences can lead to improved learning outcomes and reduced time to mastery (Savaram, 2017). Another significant area is the use of AI in automating administrative tasks for educational institutions. By automating tasks like scheduling, institutions can save time and resources, allowing educators to spend more time on teaching and less on administrative duties (Kamalov et al., 2023).

Lastly, the incorporation of virtual and augmented reality powered by AI can create immersive learning environments, enabling students to explore complex subjects in an interactive manner. Such technologies hold the potential to revolutionize fields like history and science, where students can virtually travel in time or delve deep into molecular structures (Bandopadhyay, 2023).

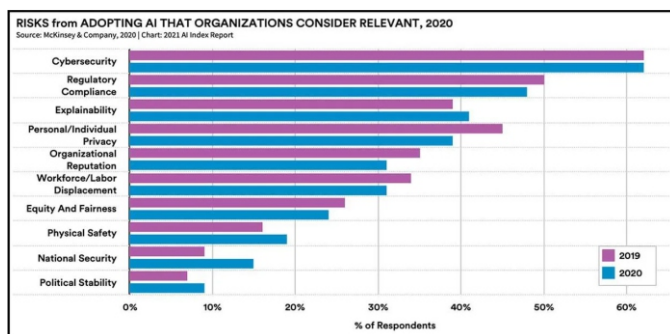


**Figure 2: Global AI in Education Market Size, by region (2016-27)**

Source: Balroop (2023)

### 3. Downsides of the Research

However, advances in AI research also have significant downsides. They have been known to disrupt people's lifestyles and negatively impact their behavior and interactions. At the level of communication, people who once had a habit of communicating directly with their entourage, whether familial or social, had numerous benefits: physiologically, emotionally, and socially. Today, some technologies based on AI research make communication virtual across machines such as computers, smartphones, and iPads. This type of communication does not facilitate the development of good, effective, and long-lasting relationships between individuals, nor does it aid in the consolidation of existing relationships. According to Frackiewicz (2023), "We now rely heavily on technology to communicate, which can lead to a lack of face-to-face interaction. This can lead to a decrease in intimacy and connection between people." Nowadays, the more people use devices to communicate, the more people act mechanically and do not allow the expression of their emotions, which, with time, no longer plays their role. Within several families, it is often noticed that members hardly communicate anymore and that each is absorbed by their smartphone, iPad, or other machines. This factor could potentially weaken family ties and cause significant psychological problems, especially for children and adolescents.



**Figure 3: Risks from Adoption of AI considered relevant by various Organizations**

Source: McKinsey & Company (2020)

### 4. Downsides at the Social Level

At the social level, machines replace tasks previously performed by humans in companies, reducing the need for employees and, thus, the opportunity to interact. According to the World Economic Forum (WEF, 2018), statistics show that "Robots will handle 52 percent of current work tasks by 2025, almost twice as many as now". This will significantly disrupt how humans earn and live. Humans have historically interacted directly with other humans. Presently, however, a machine is used as an interface, so face-to-face interactions are reduced.

Additionally, tasks and communications are carried out by machines in a mechanical way, rendering the expression of emotion difficult. The psychological damage is serious and often requires medical follow-up. Most often, employees and civil servants are stressed and depressed. It becomes harder for managers to identify and promote the right people and help needy employees. This situation could potentially be worrisome.

### CONCLUSION

As observed, AI has many advantages in human life. This intelligence has facilitated modern citizens' lives and enabled them to accomplish several complex tasks in less time and more efficiently. However, there are concerns about the plausibility of interacting with other humans in a world populated by machines, robots, and sophisticated devices that could surpass them in their reflections, analyses, and even solutions they could propose. "By 2030, most social situations will be facilitated by bots—intelligent-seeming programs that interact with us in human-like ways," said Judith Donath of the Pew Research Center. In conclusion, AI is an extraordinary human advance that has changed the lives of human beings, disrupted their habits, and influenced their behavior. The future of AI is unpredictable, and there are many expectations and concerns to consider.

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